



State Route-106 400 North in West Bountiful to US-89 in Farmington Level One Corridor Study

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UDOT
Planning Section

Executive Summary

Corridor studies are the map for the Utah Department of Transportation (UDOT) and local governments to identify, evaluate, and set priorities for the statewide transportation system. They provide information to develop regional and statewide long-range transportation plans which, in turn, provide projects to short-range transportation improvement programs.

The State Route -106 (SR-106) Corridor Study begins at milepost 0.0 on 400 North in West Bountiful, Utah and ends at the intersection of US-89 at approximately milepost 9.42. Because of the length of the corridor and the variability of traffic volume and development, it has been divided into three segments based upon historic traffic characteristics and the intensity of commercial and residential development.

The two main concerns with SR-106 are access management standards for all segments and sub-standard cross-sections within Segments 1 and 3. However, SR-106 serves as a main street for Centerville and Farmington. Therefore, context sensitive solutions could be a key issue for any project on SR-106.

A predominant characteristic of SR-106 is the presence of many driveways and streets - more than 200 on each side. Generally, 60 percent of the driveways in Segment 1 do not meet UDOT access management spacing standards. In Segments 2 and 3, 30 and 50 percent of driveways do not meet standards, respectively. Even though the access management standards were adopted after deficiencies such as driveways were built, UDOT Planning may want to recommend further analysis on this issue. Further analysis into access spacing is suggested because 70 percent of the accidents occurred at these intersections. The most dangerous access points on SR-106 are the unsignalized T-intersections and the curves in Farmington. Further consideration of altering alignments and/or signaling these intersections may reduce the number of accidents.

A section of Segment 1 does not have shoulders and a section of Segment 3 does not have sidewalks. As a way of managing travel demand and improving safety on this corridor, UDOT Planning may recommend installation of sidewalks and shoulders in areas that are deficient.

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1 IDENTIFICATION OF TRANSPORTATION CORRIDOR STUDY AREA

The Utah Department of Transportation's (UDOT) objective of corridor studies is to develop a best-practice management strategy of the overall statewide transportation system through data collection and analysis of the individual corridors of which it is comprised. Corridor studies investigate conditions of a route and develop possible transportation solutions. They provide an opportunity for UDOT and local government(s) to discuss the corridor and how the corridor does or does not serve their interests or plans. This process may identify strategies in which the corridor can best serve both state and local government interests. Corridor plans are developed from the studies and identify which possible improvements may be needed to improve Utah's transportation system into the future. Corridor plans are the map for UDOT to identify, evaluate, and set priorities for the corridor transportation system. They provide information to develop regional and statewide long-range transportation plans for the 20 plus year horizon which, in turn, provide projects to short-range transportation improvement programs for a six year planning horizon.

Corridor planning is UDOT's program for managing its transportation systems, i.e. the state-administered portion of the overall network, for the long-range plan horizon, and for establishing a vision of corridor needs beyond that. Each corridor study area includes the transportation corridor – the geographic area that influences its performance – in addition to the transportation systems and facilities that make up the corridor.

UDOT has developed and is continuing to refine a statewide highway project prioritization system. A number of factors and issues contribute to a project's priority including those related to safety criteria, capacity, pavement management, and bridge sufficiency. This system is used to determine which projects should receive priority status and to assist in establishing a system-wide needs list and long-range plan. Individual corridor plans are one of UDOT's main methods to define corridor and system needs. The proposed projects identified by corridor studies may be primarily focused on preservation, safety, system management, and/or mobility.

1.1 Corridor Description

The SR-106 Corridor Study begins at milepost 0.0 on 400 North in West Bountiful, Utah and extends northwards to milepost 9.42 at the intersection of US-89 on Shepard Lane in Farmington. Due to the length of the corridor and the variability of traffic volume and development, the corridor has been divided into three segments. The segments are based upon historic traffic characteristics and the intensity of commercial and residential development.

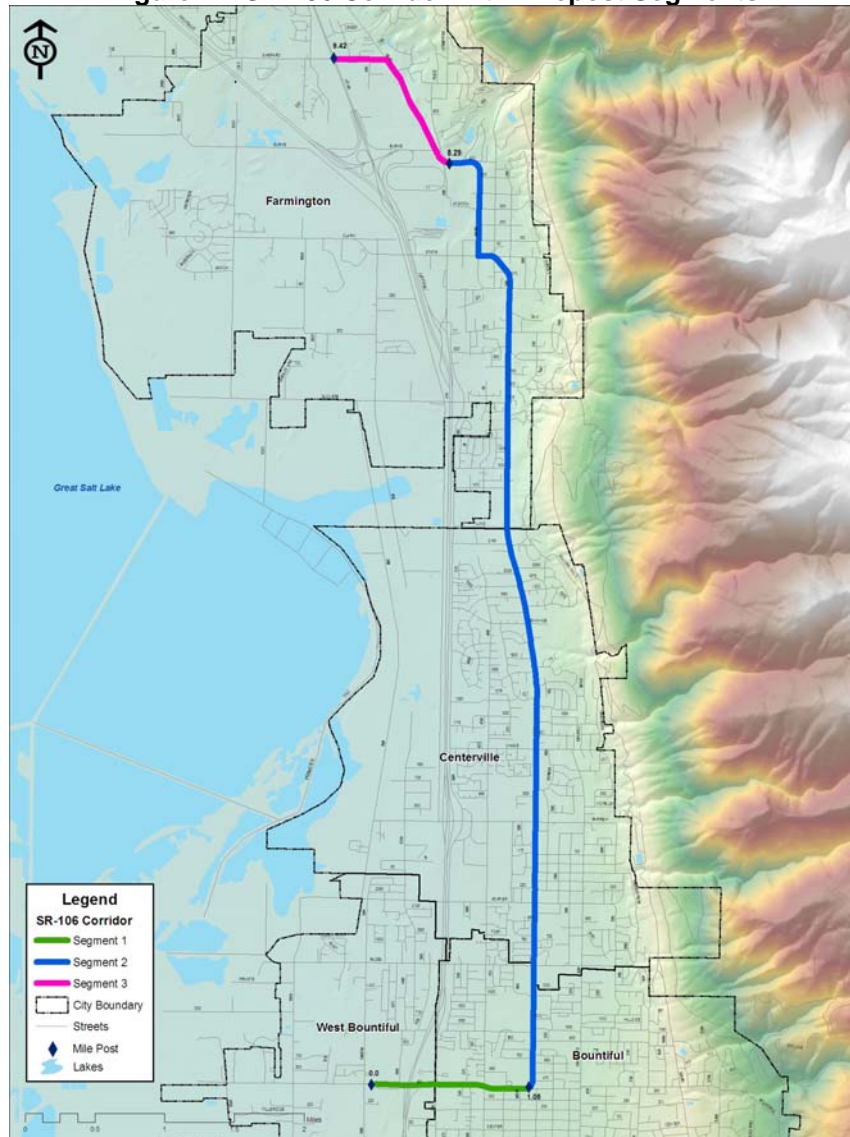
- Segment 1 begins at milepost 0.0 and ends at milepost 1.05, at the intersection of Main Street in Bountiful. Traffic volume in this segment has historically been higher than in the other two segments. There is a large amount of commercial development in this segment. Residential development also exists but is less frequent than in Segment 2.
- Segment 2 begins at milepost 1.05 and ends at milepost 8.29, at the intersection of SR-225 (675 North) in Farmington. This segment has experienced less traffic volume in the past than Segment 1 but more than Segment 3. Compared to the other segments, this area has the most residential development. Commercial development is lower than in Segment 1, but it is higher than in Segment 3.
- Segment 3 begins at milepost 8.29 and ends at milepost 9.42, at the intersection of US-89. Traffic volume and development in this segment were the lowest.

Table 1 – Corridor Characteristics

Segment	Milepost Begin	Milepost End	Historic Traffic Volume	Commercial Land Uses	Residential Land Uses
1	0.0	1.05	High	High	Medium
2	1.05	8.29	Medium	Low	High
3	8.29	9.42	Low	Medium	Low

SR-106 is primarily a two lane facility with shoulders and a center turn lane. There are 11 traffic signals in the 9.42 miles of roadway, and the posted speed limit is 35 mph. The UDOT right-of-way averages 66 feet, and there are approximately 400 driveways and streets.

Figure 1 shows a map of the SR-106 corridor with the three defined milepost segments.

Figure 1 – SR-106 Corridor with Milepost Segments

1.2 Environmental, Cultural, and Historical Locations within the Corridor

This corridor traverses through southern Davis County and serves as a north/south minor arterial accessing communities, businesses, schools, and housing. Trees lining the streets of Farmington are environmentally important features along SR-106. Historical locations within the corridor include the Third Davis County Memorial Courthouse built in 1932 at 28 East State Street in Farmington, the Historic Stone Carriage House built in 1855 at 56 North Main Street in Farmington, and the Centerville City office building located at 655 North Main Street in Centerville.

Figure 2 – Third Davis County Courthouse (1932)

Source: Davis County Government Information Systems, 2007

1.3 Historical Perspective of the Corridor

SR-106 was historically known as Lincoln Highway. It was constructed in the early 1900s by Utah prison inmates. To this day, there are portions of the original highway that still exist under the layers of newer road. The primary purpose of the corridor was to access the different cities along its way, and today it basically serves that same purpose: to provide access to communities.

1.4 Population, Employment, and Demographics

SR-106 traverses through Bountiful, Centerville and Farmington cities. According to the state population projections shown in Table 2, population is expected to continue growing in the three cities. However, Farmington is expected to experience a higher population increase than Bountiful and Centerville.

Table 2 – Population						
Year	Bountiful	10 year increase	Centerville	10 year increase	Farmington	10 year increase
2000	41,471		16,048		12,687	
2010	43,769	6%	18,534	15%	16,045	26%
2020	44,481	2%	19,982	8%	22,256	35%
2030	45,227	2%	21,609	8%	25,641	15%

Source: Governor's Office of Planning and Budget, February, 2007

Employment opportunities along SR-106 are not commensurate with the population in this area, and, therefore, Davis County remains a residential community. Centerville City's largest employers include Target, Albertson, Dick's Market, Home Depot, Management Training Corporation, and soon to be opening Wal-Mart.

Table 3 – Employment						
Year	Bountiful	10 year increase	Centerville	10 year increase	Farmington	10 year increase
2000	9,391		5,242		4,878	
2010	10,505	12%	6,280	20%	6,058	24%
2020	11,297	8%	7,519	20%	7,201	19%
2030	12,011	6%	8,390	12%	7,534	5%

Source: WFRC Technical Memo #42, 2003

2 ANALYSIS OF EXISTING CONDITIONS

The existing conditions analysis summarizes the existing land use patterns, traffic patterns/characteristics, environment, utilities, right-of-way, safety, geometric design, structures, maintenance, pavement condition, alternative modes and efficient intermodal transfer, access management strategies, and other relevant studies.

2.1 Analysis Area

The analysis area is from milepost 0.0 on 400 North in West Bountiful to milepost 9.42 at the intersection of US-89 on Shepard Lane in Farmington.

2.1.A Land Use Patterns

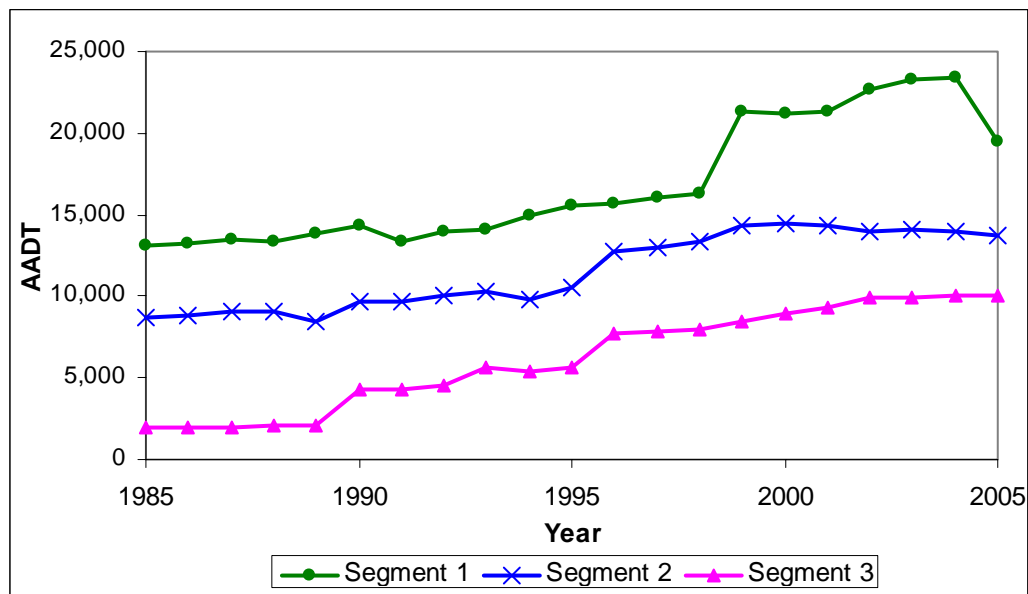
Segment 1 is characterized by mostly commercial development. There are a number of residential dwellings and schools, too. Land use in Segment 2 is basically residential, but a few commercial establishments and schools exist. Segment 3 is comprised of medium intensity commercial and residential development as well as schools. On average, the land in this corridor is 95 percent built out.

Table 4 – Land Use Characteristics			
Segment	Commercial	Residential	Schools
1	High	Medium	Yes
2	Low	High	Yes
3	Medium	Low	Yes

2.1.B Traffic Patterns/Characteristics

The major traffic generators along this corridor are schools and residential developments. The few commercial developments within SR-106 also generate some traffic.

Traffic patterns varied widely from 1985 to 2005 along SR-106 as shown in Figure 3. For example, in Segment 1 there was a sudden rise in traffic volume in 1998 to 1999 of 32 percent and a fall in 2004 to 2005 of 17 percent. To compute historic growth rates, however, it was assumed that traffic growth on this corridor was linear from 1985 to 2005. Traffic growth in Segment 1 was five percent in the 20 years from 1985 to 2005, an average of 547 additional AADT per year. Traffic in Segment 2 grew at a rate of four percent per year (348 AADT per year based on 1985 volume) from 1985 to 2005. Traffic growth in Segment 3 during this same period was 36 percent per year, or 484 AADT per year based on 1985 volume.

Figure 3 – Historic Traffic Trends

Source: Traffic on Utah Highways

2.1.C Environment

The following contains screening level information regarding various environmental topics.

Economic

SR-106 is used by many excursionists to access Lagoon Amusement Park and the various businesses within the corridor. According to UDOT's Truck Traffic on Utah Highways report in 2005, truck traffic varied from six percent near the intersection of I-15 in Bountiful to ten percent near the intersection of US-89 in Farmington. For an urban area, the percentage of truck traffic using the corridor is high. Most of the truck traffic is generated by the various industrial businesses along the corridor.

Air Quality

Davis County was a Maintenance Area for Ozone (O₃) until June 2005. After that, the standard was revoked.

Noise

The SR-106 corridor contains many residential and commercial developments close to the corridor. As traffic volumes increase along the corridor, noise concerns may develop which may require noise studies.

Water Quality

There are no known water quality issues associated with the SR-106 corridor.

Wetlands

According to the National Wetlands Inventory (NWI) maps, an eight acre wetland area has been identified just west of SR-106 at approximately 800 North 100 East in Bountiful. However, there is a residential subdivision with streets and homes built over the identified area, so it is unlikely that this area would qualify as a nationally protected wetland.

Wildlife

There are no critical habitats along the SR-106 corridor.

Threatened or Endangered Species

The following two tables contain Davis County animal and plant species that are or have been listed as one or more of the following: Federally-listed or candidate species under the Endangered Species Act (S-ESA), Wildlife species of concern (SPC), and Species receiving special management under a Conservation Agreement in order to preclude the need for Federal listing (CS). The animals and plants listed below are found in Davis County but may not be specific to the corridor of SR-106. Given the urban nature of SR-106, it is unlikely that threatened and endangered species are a significant concern.

Table 5 – Animal Species in Davis County of S-ESA, SPC, or CS Status		
Common Name	Scientific Name	State Status
American White Pelican	<i>Pelecanus erythrorhynchos</i>	SPC
Bald Eagle	<i>Haliaeetus leucocephalus</i>	S-ESA
Bluehead Sucker	<i>Catostomus discobolus</i>	CS
Bobolink	<i>Dolichonyx oryzivorus</i>	SPC
Bonneville Cutthroat Trout	<i>Oncorhynchus clarkii</i> Utah	CS
Burrowing Owl	<i>Athene cunicularia</i>	SPC
Columbia Spotted Frog	<i>Rana luteiventris</i>	CS
Ferruginous Hawk	<i>Buteo regalis</i>	SPC
Grasshopper Sparrow	<i>Ammodramus saviarum</i>	SPC
Kit Fox	<i>Vulpes macrotis</i>	SPC
Least Chub	<i>Iotichthys phlegethontis</i>	CS
Lewis's Woodpecker	<i>Melanerpes lewis</i>	SPC
Long-Billed Curlew	<i>Numenius americanus</i>	SPC
Short-Eared Owl	<i>Asio flammeus</i>	SPC
Townsend's Big-Eared Bat	<i>Corynorhinus townsendii</i>	SPC
Western Pearlshell	<i>Margaritifera falcata</i>	SPC
Western Toad	<i>Bufo boreas</i>	SPC
Yellow-Billed Cuckoo	<i>Coccyzus americanus</i>	S-ESA

S-ESA (Federally-listed or candidate species under the Endangered Species Act)

SPC (Wildlife species of concern)

CS (Species receiving special management under a Conservation Agreement in order to preclude the need for Federal listing)

Source: *State of Utah, Natural Resource, Division of Wildlife Resources, Sensitive Species by County, 2006.*

Table 6 – Plants in Davis County of S-ESA, SPC, or CS Status		
Common Name	Scientific Name	State Status
Utah Angelica	Angelica Wheeleri	Rare

Source: State of Utah, Natural Resource, Division of Wildlife Resources, Plants.

Flood Plain

The Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) showed no designated flood zones within the corridor.

Wild and Scenic Rivers

According to the National Wild and Scenic Rivers System website, there are no wild and scenic rivers within the vicinity of the corridor.

Historic and Archeological Preservation

At milepost 7.0 in Farmington, there is a cemetery to the east of the corridor. In Centerville, there is a statue that commemorates Centerville pioneers. Other historic sites include the Third Davis County Memorial Courthouse at 28 East State Street in Farmington, the Historic Stone Carriage House at 56 North Main Street in Farmington, and the Centerville City office building located at 655 North Main Street in Centerville.

Figure 4 – Centerville Pioneers Statue



Fossil Preservation

No known fossil preservation is being conducted along the corridor.

Hazardous Waste Sites

No known hazardous waste sites have been identified along the corridor.

Visual Impacts

The historic Sycamore trees in Farmington add aesthetic value to SR-106.

Figure 5 – Sycamore Trees in Farmington

Prime and Unique Farmlands

No prime and unique farm lands were identified.

Section 4(f) Properties

The U.S. Department of Transportation's Section 4(f) law (49 USC 303) states that federal funds may not be approved for projects that use land from a significant publicly owned park, recreation area, wildlife or waterfowl refuge, or any significant historic site. Exceptions may be permitted if it is determined that there is no feasible and prudent alternative to the use of land from such properties and the action includes all possible planning to minimize harm to the property resulting from such use. The following list includes possible Section 4(f) designations:

Table 7 – Possible Section 4(f) Designations	
Location	Milepost
I-15 bridge underpass	0.5
West Bountiful Elementary School	1.0
Bountiful Junior High School	1.25
Viewmont High School	1.7
Tolman Elementary School	2.0
J. A. Taylor Elementary School	3.1
Centerville Elementary School	3.2
Knowlton Elementary School	9.1

2.1.D Utilities

The three segments of the corridor contain standard utilities common to an urban environment such as communication, natural gas, power, sewer, and water lines.

Table 8 – Utilities along SR-106							
Segment	Beg. mp	End mp	Water	Sewer	Telephone	Power	Gas
Segment 1	0	1	Yes	Yes	Yes	Yes	No
Segment 2	1	2	Yes	Yes	Yes	No	No
	2	3	No	Yes	Yes	Yes	Yes
	3	4	No	Yes	Yes	Yes	No
	4	5	Yes	Yes	Yes	Yes	No
	5	6	No	Yes	Yes	Yes	No
	6	7	Yes	Yes	Yes	Yes	No
	7	8	Yes	Yes	Yes	No	No
Segment 3	8	9	Yes	Yes	Yes	Yes	No
	9	9.42	No	Yes	No	Yes	No

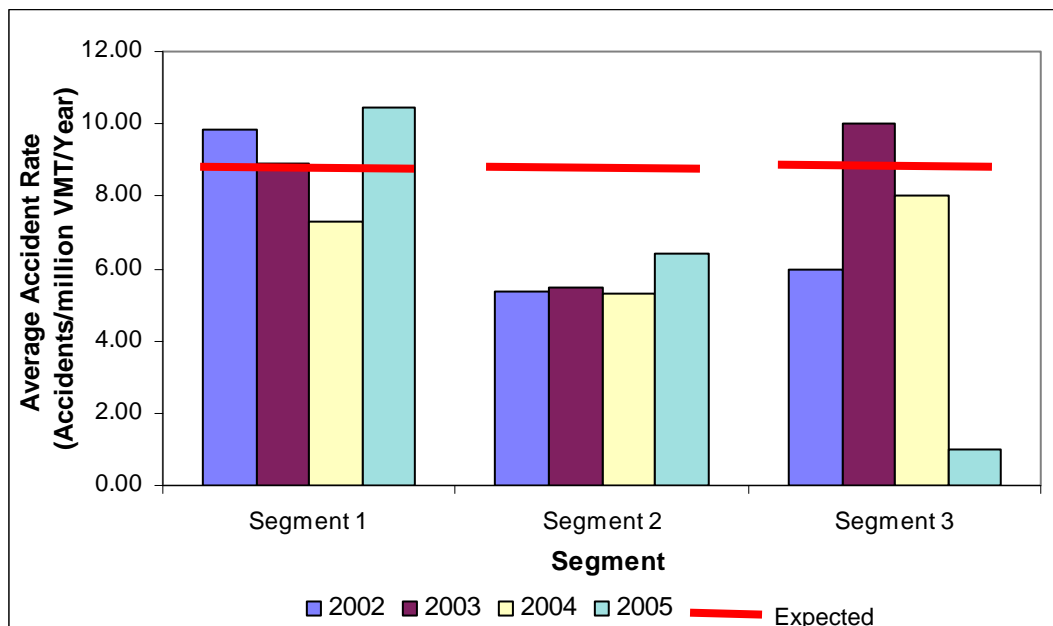
2.1.E Right-of-Way

Most of the land adjacent to SR-106 is privately owned. The right-of-way is approximately 66 feet. Most of SR-106 is a two lane facility. Within or next to the right-of-way in Farmington are historic Sycamore trees that line both sides of the street. Another constraint that might limit right-of-way expansion is overhead utility lines that run parallel to the corridor in Centerville and Bountiful.

Table 9 – Right-of-Way Width	
Segment	Right-of-Way (ft)
1	66
2	66
3	66

2.1.F Safety

Figure 6 shows the average and expected accidents rates over a four year period. Expected accident values for each segment are shown as provided by UDOT for the years 2002 to 2005. Both average and expected accident rates are reported in number of accidents per million Vehicle Miles Traveled (VMT) per year. For an urban road, expected accident rate depends on the functional class of the roadway, AADT, and the population in close proximity of the roadway. SR-106 is classified as an Urban Minor Arterial.

Figure 6 – Average and Expected Accident Rates

The accident rate for Segment 1 decreased every year except in 2005 when the rate went up. Historic traffic trends have shown an increase in traffic volume in Segment 1 from 2002 to 2004 but a decrease in 2005. For Segment 2 the accident rate did not fluctuate during the four years analyzed. Similarly, traffic volume was almost constant during this time. In Segment 3 the accident rate increased from 2002 to 2003 but decreased every year thereafter. In 2005, the accident rate was 1.0. Historic traffic analysis has shown that traffic volume remained almost constant from 2002 to 2005.

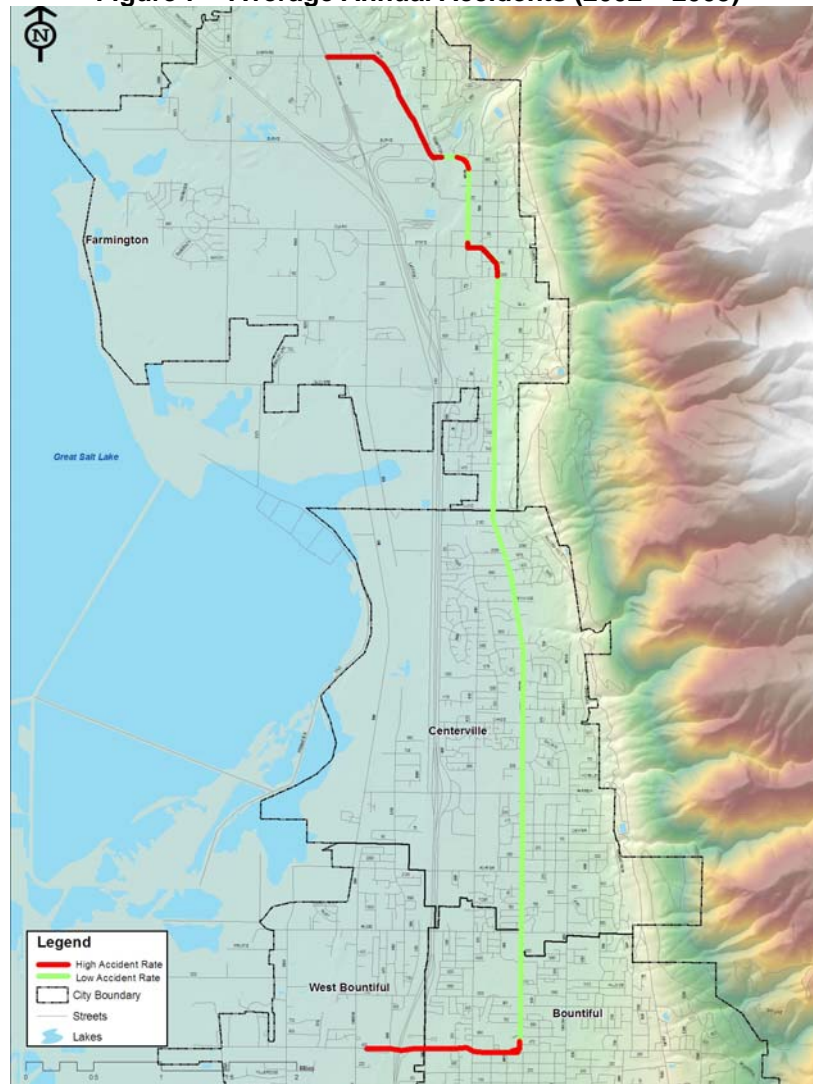
In Segment 1, average accident rates were slightly higher than expected in 2002 and 2005. Segment 2 experienced fewer accidents than expected for the four years analyzed. Expected accident rate was only slightly exceeded in Segment 3 in 2003. Therefore, there are no serious accident concerns on this corridor.

Analysis of accident data has shown that 70 percent of the total accidents occurred at the intersections. Approximately 90 percent of the accidents at intersections were right angle collisions between left turning traffic and opposing through traffic. The remaining 10 percent included rear end collisions, T-bone collisions, etc. Of the non-intersection accidents, 15 percent were head-on collisions and 15 percent involved vehicles roadway departure crashes. Two fatalities were reported in 2002. Other accidents resulted in different types of injuries or, possibly, no injuries.

Table 10 – Expected Accident Rates						
Milepost	AADT (Weighted Average)				AADT Weighted Average for the 4 Years for the Whole Segment	Expected Accident Rate (Accidents per million VMT per year)
	2002	2003	2004	2005		
Segment 1 (mp 0.0 – mp 1.05)	22,860	23,329	23,470	19,701	14,147	9.01
Segment 2 (mp 1.05 – mp 8.29)	13,491	13,675	13,717	13,536		
Segment 3 (mp 8.29 – mp 9.42)	9,976	9,976	10,036	10,026		

Source: UDOT Traffic & Safety Division

Figure 7 – Average Annual Accidents (2002 – 2005)



2.1.G Geometric Design

Roadway

The roadway geometrics (travel lanes, lane widths, center turn lanes, intersection additional turn lanes, channelized right turns, paved shoulders, curb and gutter, and sidewalk) along the corridor are inventoried in Table 11. Each of these features affects capacity and safety of the corridor in various ways. For example, turn lanes are necessary to reduce the conflict between the slow speed turning traffic and the high speed through traffic.

Table 11 – Roadway Geometrics			
Feature	Segment 1	Segment 2	Segment 3
Number of Travel Lanes	2 (mp 0.0 – 0.37) 4 (mp 0.37 – 1.05)	2	2
Lane Widths (feet)	12	12	12
Center Turn Lanes	70%	85%	40%
Intersection Additional Turn Lanes	Yes		Yes
Channelized Right Turns	Yes	No	Yes/No
Paved Shoulders	No (mp 0.0 – 0.37) Yes (mp 0.37 – 1.05)	Yes	Yes
Curb, Gutter	60%	80%	30%
Sidewalk	100%	80%	0%

Intersections

SR-106 is not perpendicularly aligned with the following side roads: 200 West (milepost 1.12), 400 North – the Y intersection (milepost 1.16), 100 South (milepost 7.06), Quail Run Road (milepost 8.96), and Shepard Lane (milepost 9.06). The AASHTO Green Book states that, for safety and economy, intersecting roads should generally meet at right angles.

A predominant characteristic of SR-106 is the presence of many side roads or major commercial driveways which form T-intersections with the corridor. Some of the side roads on opposite sides of the corridor are closely spaced, creating an offset intersection. This creates confusion for through traffic on the side roads, and it poses a safety concern. Examples include 1000 North and 1050 North (milepost 1.60), 850 South and 900 South (milepost 2.17), 780 South and 800 South (milepost 2.23), 300 South and Walton Lane (milepost 2.59), and 100 North and 115 North (milepost 2.85).

2.1.H Structures

Perhaps the only structures of importance along this corridor are the SR-106 bridge passing over I-15 and the bridge crossing over Farmington Creek and the Farmington Creek Trail.

2.1.I Maintenance

The UDOT Maintenance staff indicated that the outer lanes of SR-106 in Bountiful do not have a base course layer. The asphalt layers were built over a sand layer. The UDOT maintenance staff in Centerville cited that some trees planted on the western park strip at milepost 2.0 are creating sight distance problems for motorists, and they are obstructing pedestrians using the sidewalk. In Farmington, snow plowing has not been done promptly. The edges of the pavement are severely cracked and worn out at some locations in Centerville, as shown in the photo below taken at milepost 3.2.

Figure 8 – Potholing and Cracking at Milepost 3.2



2.1.J Pavement Condition

A 10-year preservation program from 2011 to 2020 is shown in Table 12. Currently, there are no scheduled safety improvements for this corridor.

Table 12 – System Preservation Plan (2011 – 2020)				
Milepost	Element ID	Year	Treatment	Cost
0.00 – 0.859	106P-00000	2014	Minor Asphalt Rehabilitation	\$1,195,823
0.00 – 0.859	0D 631B	2013	Replace Deck	\$1,204,262
0.00 – 0.859	0D 631A	2015	Replace Structure	\$3,004,318
0.859 – 5.187	106P-00086	2011	Major Asphalt Rehabilitation	\$3,066,237
5.187 – 9.422	106P-00519	2006*	Functional Repair	\$1,117,896
5.187 – 9.422	106P-00519	2014	Chip Seal	\$442,537

Source: UDOT System Preservation Plan 2011-2020

*Has been postponed until 2008 – UDOT Maintenance indicated

Drainage

UDOT Maintenance staff mentioned that water emitted by some springs during the summer season in Farmington needs to be redirected away from the road. There were no other drainage issues observed.

Striping and Signing

Lane striping has faded in some areas from milepost 2 to milepost 7, and it could be refreshed during the next painting season. UDOT Maintenance personnel stated that several speed limit signs and advance warning signs for curves are missing. However, the school crossing zone signs are well maintained.

2.1.K Alternative Modes and Efficient Intermodal Transfer

Evaluating alternative modes of transportation is important to a functional and efficient transportation system. By reviewing modes beyond the traditional highway user as potential solutions, UDOT can move forward in providing a best-practice transportation system.

- Pedestrian – Most of the route has sidewalks except from milepost 8.1 to 9.0.
- Bicycle – There are no exclusive bike lanes along SR-106 but there are shoulders in most parts of the corridor. There is a bike trail that travels under SR-106 at milepost 8.19.
- Transit – Currently, the Utah Transit Authority (UTA) has three routes that have several stops on the corridor: Route 55, Route 71, and Route 77. UTA's Frontrunner commuter rail will have a station at 700 North Park Lane in Farmington and will operate from Pleasant View to Salt Lake City along 38 miles of track.

The South Davis Transit Draft Environmental Impact Statement (DEIS) is being conducted to identify the best transit solution or solutions for South Davis County. Planning and coordination should also continue to take place in other systems of transportation including air and truck

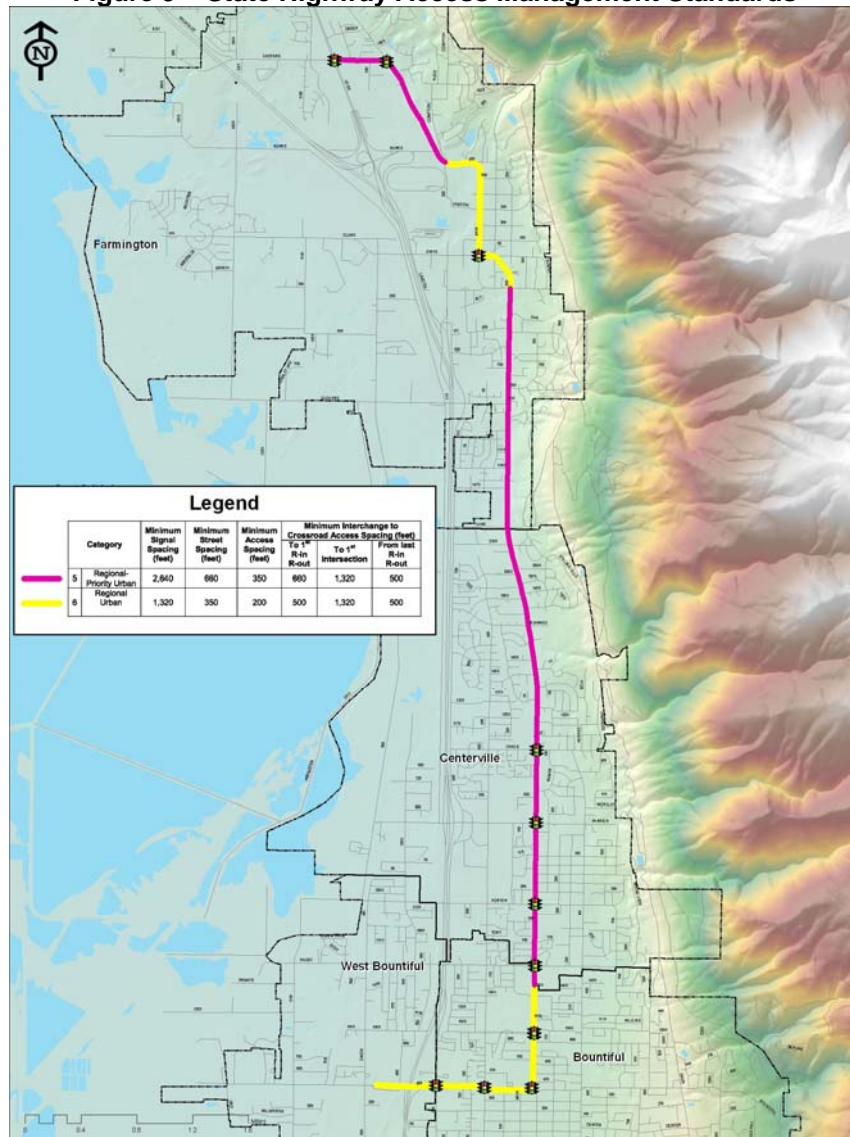
transportation, pipelines, and railroads. UDOT plays an important coordination role with each of these, particularly in ensuring efficient intermodal transfer with the highway system.

- Aviation – There are no aviation services along SR-106.
- Truck – Most of the truck traffic is generated by the various industrial businesses along the corridor. As mentioned earlier, truck traffic varied from six percent near the intersection of I-15 in Bountiful to ten percent near the intersection of US-89 in Farmington.
- Pipeline – There are no signs of any existing pipeline.
- Railroad – There are no highway-rail grade crossings.

2.1.L Access Management Strategies

UDOT adopted Administrative Rule R930-6 to accommodate utilities and to control and protect state highway rights-of-way. The state highway access standards contain nine different categories. SR-106 has two access management categories in the study area. They are shown in Figure 9. However, the current access points along the corridor do not meet the access management standards. Access management deficiencies are detailed in Section 5.2.A (Corridor Wide Recommendations) of this document.

Figure 9 – State Highway Access Management Standards



Source: UDOT Administrative Rule R930-6, May, 2006

2.1.M Relevant Studies

Traffic Signals and Traffic Control Devices

Field observations showed no long queues or delays at the signalized intersections in Segments 1 and 3. In Segment 2, short queues of about 5 to 10 vehicles were observed. The signalized intersections are listed in Table 13.

Table 13 – Signalized Intersections					
Segment 1		Segment 2		Segment 3	
Intersection	Milepost	Intersection	Milepost	Intersection	Milepost
500 West	0.50	400 North	1.14	Shepard Ln	9.08
200 West	0.84	Viewmont Drive	1.57	US-89	9.42
		Pages Lane	2.05		
		Porters Lane	2.50		
		Parrish Lane	3.08		
		Chase Lane	3.61		
		State Street	7.32		

Based on the access management categories of SR-106, the two signalized intersections in Segment 1 meet standards, three of the intersections in Segment 2 (Viewmont Drive, Pages Lane and Porters Lane) do not meet standards, and the two intersections in Segment 3 do not meet standards.

There are numerous unsignalized intersections along SR-106. Most of them are T-intersections. As discussed in the safety data analysis section, most of the accidents took place at these intersections, especially the unsignalized intersections at the curves. UDOT may want to conduct further study to correct the misalignment and evaluate whether signal control is warranted at these intersections.

3 FUTURE CONDITIONS FORECAST

In this section, future conditions for land use, population, travel demand, and mobility needs will be discussed to show potential growth and its impacts on road conditions.

3.1 Analysis Area

The analysis area is from milepost 0.0 on 400 North in West Bountiful and ends at the intersection of US-89 on Shepard Lane in Farmington at approximately milepost 9.42.

3.1.A Land Use Plans and Population Growth

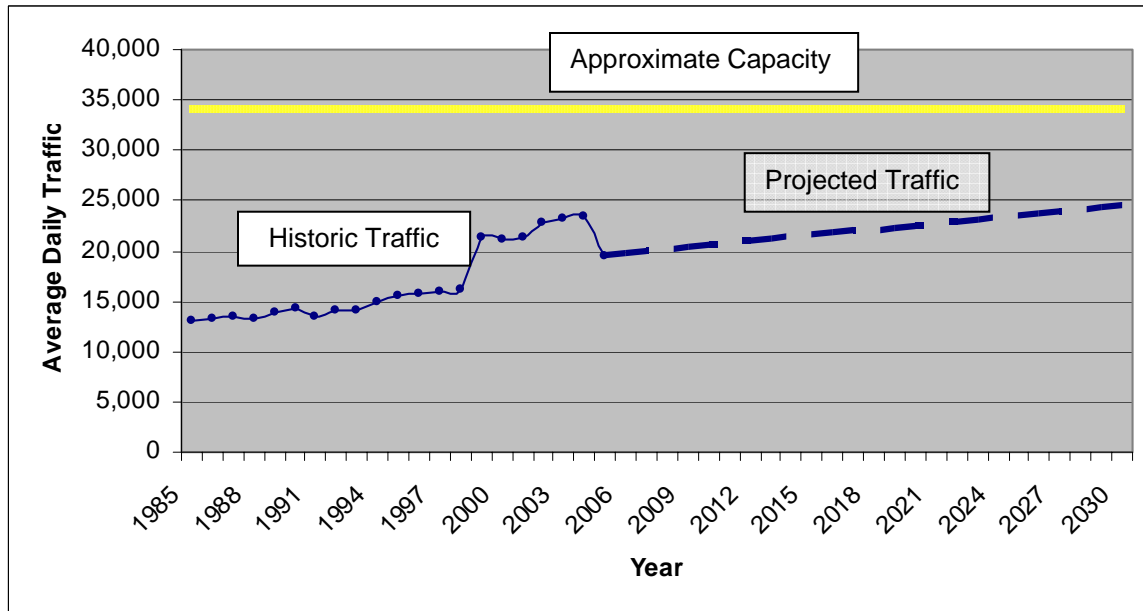
Future land use along this corridor is expected to be heavily residential with some commercial usage and schools.

3.1.B Travel Demand Growth

Traffic volume was projected to reflect Wasatch Front Regional Council (WFRC) 2030 volume estimates as shown in Figures 10 and 11. The WFRC estimates future traffic based on socio-economic data.

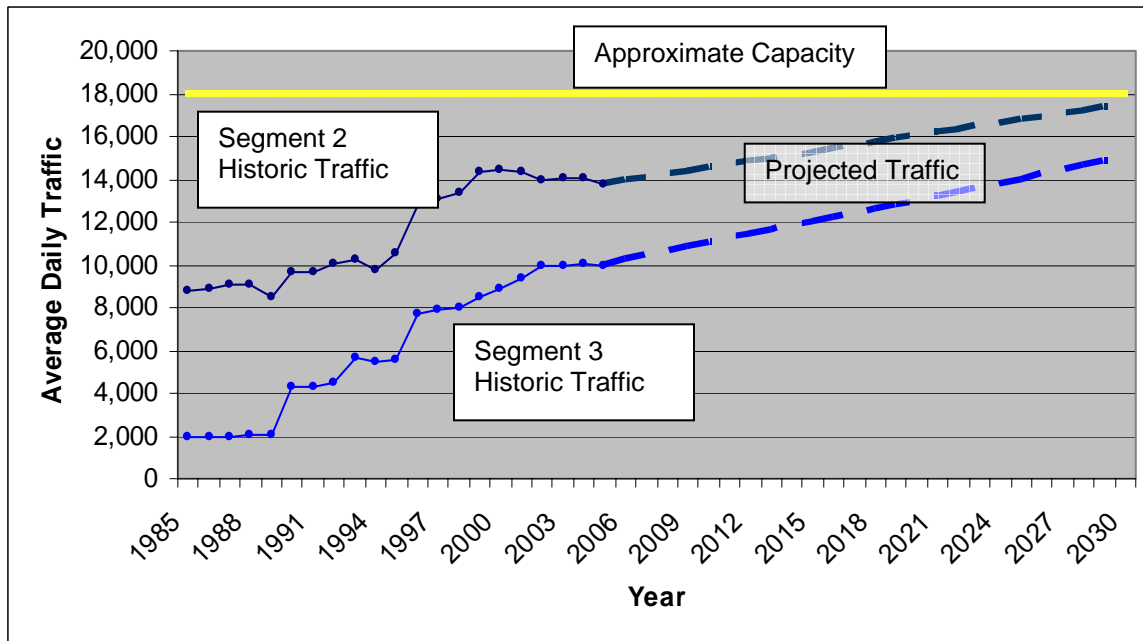
Two-thirds of Segment 1 of SR-106 is a four-lane highway with a center-turn lane, and the rest is a two-lane roadway. However, for analysis purposes, the capacity for the whole of Segment 1 has been estimated to be 34,000 vehicles per day which is the approximate capacity of a four-lane arterial. Figure 10 shows that this capacity will not be exceeded in the next 25 years. Segments 2 and 3 have two lanes, and the capacity is estimated to be 18,000 vehicles per day. It can be observed from Figure 11 that demand will not exceed capacity in these two segments by 2030. Therefore, there are no capacity issues anticipated on SR-106 by the year 2030.

Figure 10 – Traffic Forecast for Segment 1



Source: Traffic on Utah Highways; Wasatch Front Regional Council

Figure 11 – Traffic Forecasts for Segments 2 and 3



Source: Traffic on Utah Highways; Wasatch Front Regional Council

Table 14 – Projected Traffic Volumes			
Year	Segment 1	Segment 2	Segment 3
2005	19,438	13,759	9,995
2015	21,500	15,000	12,000
2030	24,500	17,500	15,000

3.1.C Present and Future Mobility Needs

The present and future mobility needs of the corridor are largely related to automobile traffic. However, UDOT and UTA are working together on the South Davis County Transit Study to determine if transit is needed along SR-106 and, if so, what types of transit will work for the residents, the communities, UTA, and UDOT.

The South Davis Transit Draft Environmental Impact Statement (DEIS) is being conducted to identify the best transit solution or solutions for South Davis County. The project is divided into two phases:

1. The first phase is comprised of an Alternatives Analysis process that satisfies Federal Transit Administration (FTA) requirements for projects that receive federal funding. The Alternatives Analysis will conclude at the identification of a locally preferred alternative, commonly referred to as the LPA. The scheduled date for the LPA to be determined is autumn 2007.
2. The second phase of the South Davis Transit DEIS is the development of a DEIS, pursuant to the requirements of the National Environmental Policy Act (NEPA).

4 PUBLIC INVOLVEMENT

The SR-106 Corridor Study begins in West Bountiful and travels through Bountiful and Centerville before ending in Farmington. These four communities were involved in the study through participating in a corridor drive and a public open house.

4.1 History of Public Involvement

The corridor drive took place on February 1, 2007. Representatives from the four communities and UDOT Region One were invited to participate in the corridor drive. During the drive, several comments were made about coordination between UDOT and the cities and about future maintenance projects. This meeting provided a formal opportunity for communication to occur between the professional city staffs and UDOT Maintenance staff. A representative from UDOT Planning Department was also present.

The public open house took place from 4:30 p.m. to 7:00 p.m. on April 11, 2007 at the Centerville City offices. At least 39 people participated in the open house and 11 written comments were received (see Appendix).

Figure 12 – Public Open House



4.2 Outreach Methods and Tools Used

The public involvement coordinator for UDOT Planning worked with Region One's public involvement coordinator to plan the public open house. A press release was written and sent to local newspapers, and an announcement was placed in the utility billing notices (see Appendix). An article was also written in the Davis County Clipper (see Appendix).

4.3 Groups Involved and Summary of Contacts Made

Most of the participation was from residents of the communities and professional staff of the cities. They visited with UDOT personnel, and some submitted written comments.

4.4 Summary of Public Concern

Most of the comments centered on the following three issues:

- Pedestrian Safety
- Transit
- Coordination between UDOT and the cities

5 CORRIDOR-WIDE RECOMMENDATIONS

UDOT has four strategic goals upon which their transportation work is centered. The four strategic goals are listed below.

- Take Care of What We Have
- Make the System Work Better
- Improve Safety
- Increase Capacity

The deficiencies that are identified in this report are listed under the four goals.

5.1 Take Care of What We Have

5.1.A Maintenance and Operations Deficiencies

Maintenance and operations deficiencies that have been identified include the following:

1. At milepost 3.2, cracked and severely worn out edges of the pavement could be patched.
2. At milepost 2.0, trees on the western park strip could be evaluated for sight distance and pedestrian movement.
3. Water from springs in Farmington could be redirected so that it does not run across the road.
4. Re-striping at milepost 3.2 and various other locations would enhance visibility of travel lanes.

5.1.B Right-of-way

The current right-of-way is approximately 66 feet. If additional right-of-way is needed in the future, UDOT may need to perform further analysis before right-of-way is purchased.

5.2 Make the System Work Better

5.2.A Access Management

As mentioned earlier, a predominant characteristic of SR-106 is the presence of many driveways and streets – more than 200 on each side, or an average of 21 per mile. Thus, conformity to access management standards has been addressed per segment. Sixty percent of the driveways in Segment 1, roadway defined as access management Category 5, do not meet UDOT access management spacing standards. Category 5 requires 660 feet between street access points and 350 feet between driveways. Segment 2 is defined as Category 5 in its center and Category 6 at its north and south ends. Segment 3 is entirely Category 6, which requires 350 feet between street access points and 200 feet between driveways. In Segments 2 and 3, 50 percent of driveways do not meet standards. An evaluation of the corridor's access management designation may be needed.

Note: Access management standards were adopted after deficiencies such as driveways were built.

5.2.B Intelligent Transportation Systems

Intelligent Transportation Systems (ITS) refers to transportation systems which apply emerging hard and soft information system technologies to address and alleviate transportation congestion problems. ITS can be subdivided into three categories: Advanced Traveler Information Systems (ATIS), Advanced Traffic Management Systems (ATMS), and Advanced Vehicle Control Systems (AVCS). The ITS strategies that can help SR-106 function more efficiently include updating signal timing plans and coordinating signalized intersections.

5.3 Improve Safety

5.3.A Reduce Crash Rates

The rate of accident occurrence on this corridor may be reduced by:

1. Improving intersection operation by ensuring proper striping, signing, and signal timing.
2. Replacing the advanced warning signs for curves in Bountiful and Farmington. Also, replacing missing speed limit signs that have been broken or vandalized.
3. Performing signal warrant analysis at major unsignalized intersections, especially intersections located at curves, to determine whether signals need to be installed.

4. Considering alignments that would reduce the number of accidents at the intersections located at curves, e.g., a signalized T-intersection.
5. Constructing sidewalks from milepost 8.1 to milepost 9.0.

5.3.B Turn Lanes

Center and right turn lanes improve safety by reducing conflicts between motorists at intersections. However, turn lanes increase conflicts between motorists and bicyclists where bike lanes exist. Turn lanes have been provided at most of the intersections. At some major driveways, turn lanes are not striped, but wide shoulders or a center turn lane are available that can be utilized by turning vehicles.

5.3.C Shoulders

Paved shoulders are nonexistent from milepost 8.1 to milepost 9.0. Currently, there are no bike lanes along this corridor. Areas with paved shoulders could serve as areas for bike routes.

5.4 Increase Capacity

5.4.A Travel Demand Management

Travel Demand Management (TDM) is the planning and implementation of programs that seek to reduce road space demand by influencing travel choices and the amount and timing of travel. TDM aims to encourage more walking, cycling, public transit use, car-pooling, and tele-commuting. The following strategies can help reduce demand for space on SR-106:

1. Accommodate bikes consistently with UDOT policies and plans.
2. Install sidewalks from milepost 8.1 to milepost 9.0.

5.4.B Additional Highway Capacity

There are no capacity issues identified within SR-106. Thus, no capacity improvements are needed.

5.4.C Transit

UDOT and UTA are working together on the South Davis County Transit Study to determine if transit is needed along SR-106 and, if so, what types of transit will work for the residents, the communities, UTA, and UDOT.

6 LIST OF RECOMMENDED PROJECTS AND COST ESTIMATES

The objective of this study was to identify existing deficiencies and future corridor operational, capacity, and geometric characteristics that will become needs. Another objective was to develop a list of improvement projects that will enhance the performance of the corridor. After analyzing the existing conditions and future requirements on SR-106, InterPlan recommends that the improvements presented in Table 15 be implemented. This list also includes existing projects contained in the system preservation plan.

Table 15 – Recommended Improvement Projects				
Project	Begin MP	End MP	Year	Cost Estimate
Segment 1				
1. Install safety improvements^ <ul style="list-style-type: none"> • Install warning signs for the curve • Stripe shoulders (for bike lanes) and travel lanes 	0.37	1.05	2008	\$92,000
2. Minor asphalt rehabilitation*	0.859	1.05	2011	\$135,316
3. Replace deck*	0.0	0.859	2013	\$1,204,262
4. Minor asphalt rehabilitation*	0.0	0.859	2014	\$1,195,823
5. Replace structure*	0.0	0.859	2015	\$3,004,318
Segment 2				
1. Install safety improvements^ <ul style="list-style-type: none"> • Stripe shoulders (for bike lanes) and travel lanes • Install warning signs for curves • Cutting down trees • Redirecting water flow from springs 	1.05	8.29	2008	\$985,000
2. Functional repair**	5.187	8.29	2006	\$819,086
3. Patching edges of pavement crack sealing	3.0	3.3	2008	\$126,864
4. Minor asphalt rehabilitation*	1.05	5.187	2011	\$2,930,920
5. Chip seal*	5.187	8.29	2014	\$324,248
Segment 3				
1. Install safety improvements^ <ul style="list-style-type: none"> • Stripe shoulders (for bike lanes) and travel lanes 	8.29	9.42	2008	\$148,000
2. Functional repair**	8.29	9.422	2006	\$298,809
3. Chip seal*	5.187	8.29	2014	\$118,288

*UDOT System Preservation Plan 2011-2020

^InterPlan's Estimate Using UDOT's Statewide Standard Item Average Prices, 2006 (See Appendix)

**Postponed until 2008

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8 APPENDIX

Appendix 8A – Annual Average Daily Traffic (AADT)						
Year	Segment 1 (mp 0.0-mp 1.05)		Segment 2 (mp 1.05-mp 8.29)		Segment 3 (mp 8.29-mp 9.42)	
	AADT	Forecast	AADT	Forecast	AADT	Forecast
1985	13,078		8,738		1,910	
1986	13,275		8,868		1,935	
1987	13,473		9,043		1,960	
1988	13,313		9,033		2,045	
1989	13,803		8,515		2,075	
1990	14,370		9,670		4,300	
1991	13,410		9,671		4,333	
1992	14,000		10,018		4,528	
1993	14,123		10,278		5,633	
1994	14,968		9,803		5,425	
1995	15,525		10,583		5,595	
1996	15,685		12,733		7,703	
1997	16,060		13,038		7,888	
1998	16,253		13,403		7,983	
1999	21,373		14,382		8,453	
2000	21,213		14,438		8,865	
2001	21,279		14,365		9,320	
2002	22,713		13,913		9,950	
2003	23,260		14,096		9,950	
2004	23,400		14,021		10,010	
2005	19,438		13,759		9,995	
2006		19,640		13,909		10,195
2007		19,843		14,058		10,395
2008		20,045		14,208		10,596
2009		20,248		14,358		10,796
2010		20,450		14,507		10,996
2011		20,653		14,657		11,196
2012		20,855		14,806		11,396
2013		21,058		14,956		11,597
2014		21,260		15,106		11,797
2015		21,463		15,255		11,997
2016		21,665		15,405		12,197
2017		21,868		15,555		12,397
2018		22,070		15,704		12,598
2019		22,273		15,854		12,798
2020		22,475		16,004		12,998
2021		22,678		16,153		13,198
2022		22,880		16,303		13,398
2023		23,083		16,453		13,599
2024		23,285		16,602		13,799
2025		23,488		16,752		13,999
2026		23,690		16,901		14,199
2027		23,893		17,051		14,399
2028		24,095		17,201		14,600
2029		24,298		17,350		14,800
2030		24,500		17,500		15,000

Appendix 8B – Accident Data Analysis for SR-106							
Segment		2002			2003		
Beg MP	End MP	# of Accidents	AADT	Acc. Rate	# of Accidents	AADT	Acc. Rate
0.0	0.45	26	21,680	7.30	24	22,775	6.42
0.45	1.05	61	23,745	11.73	56	23,745	10.77
Weighted Average Values (Segment 1, mp 0.0 - mp 1.05)			22,860	9.83		23,329	8.90
1.05	1.53	12	17,285	3.96	19	17,285	6.27
1.53	1.84	2	14,450	1.22	6	14,450	3.67
1.84	3.05	54	11,195	10.92	71	12,295	13.08
3.05	5.19	51	13,985	4.67	38	13,985	3.48
5.19	7.29	38	13,515	3.67	25	13,515	2.41
7.29	8.29	27	13,045	5.67	35	13,045	7.35
Weighted Average Values (Segment 2, mp 1.05 – mp 8.29)			13,491	5.37		13,675	5.50
8.29	9.05	20	10,025	7.19	27	10,025	9.71
9.05	9.42	6	9,875	4.50	16	9,875	12.00
Weighted Average Values (Segment 3, mp 8.29 – mp 9.42)			9,976	6.00		9,976	10.00

Appendix 8C – Accident Data Analysis for SR-106							
Segment		2004			2005		
Beg MP	End MP	# of Accidents	AADT	Acc. Rate	# of Accidents	AADT	Acc. Rate
0.0	0.45	19	22,910	5.05	25	17,590	8.65
0.45	1.05	47	23,890	8.98	55	21,285	11.8
Weighted Average Values (Segment 1, mp 0.0 - mp 1.05)			23,470	7.30		19,701	10.45
1.05	1.53	36	17,390	11.82	39	17,335	12.84
1.53	1.84	13	13,570	8.47	11	13,530	7.19
1.84	3.05	63	12,370	11.53	70	13,800	11.49
3.05	5.19	45	14,070	4.09	62	14,025	5.66
5.19	7.29	22	13,600	2.11	27	13,560	2.6
7.29	8.29	15	13,125	3.13	24	10,305	6.38
Weighted Average Values (Segment 2, mp 1.05 – mp 8.29)			13,717	5.33		13,536	6.39
8.29	9.05	25	10,085	8.94	2	10,085	0.71
9.05	9.42	8	9,935	5.96	2	9,905	1.5
Weighted Average Values (Segment 3, mp 8.29 – mp 9.42)			10,036	8.0		10,026	1.0

Appendix 8D – Cost Estimates for SR-106 Safety Improvements					
ITEM	COST	UNIT	QUANTITY PER LINEAR FOOT		COST PER LINEAR FOOT OF ROADWAY
Pavement Marking Paint	\$2.45	Ft	5*1	5.0	\$ 12.25
				Subtotal	\$ 12.25
Signs (New)	calculated @ 1.5% of subtotal				\$ 0.18
New and Reconstructed Lighting	calculated @ 1.5% of subtotal				\$ 0.18
				Subtotal	\$ 12.62
Mobilization and Temporary Traffic Control	calculated @ 15% of subtotal				\$ 1.89
Contingency	calculated @ 20% of subtotal				\$ 2.52
				Subtotal	\$ 17.03
Engineering, construction, management, drainage & utilities	calculated @ 40% of subtotal				\$ 6.81
Contingency for Price Increases	calculated @ 10% of subtotal				\$ 1.70
TOTAL COST PER LINEAR FOOT					\$ 25.55
TOTAL COST OF SAFETY IMPROVEMENTS FROM MILEPOST 0.37 TO MILEPOST 1.05					\$ 91,736.29

ITEM	COST	UNIT	QUANTITY PER LINEAR FOOT		COST PER LINEAR FOOT OF ROADWAY
Pavement Marking Paint	\$2.45	Ft	5*1	5.0	\$ 12.25
				Subtotal	\$ 12.25
Signs (New)	calculated @ 1.5% of subtotal				\$ 0.18
New and Reconstructed Lighting	calculated @ 1.5% of subtotal				\$ 0.18
Cutting down trees	calculated @ 0.2% of subtotal				\$ 0.02
Redirecting water flow from springs	calculated @ 0.5% of subtotal				\$ 0.06
				Subtotal	\$ 12.70
Mobilization and Temporary Traffic Control	calculated @ 15% of subtotal				\$ 1.91
Contingency	calculated @ 20% of subtotal				\$ 2.54
				Subtotal	\$ 17.15
Engineering, construction, management, drainage & utilities	calculated @ 40% of subtotal				\$ 6.86
Contingency for Price Increases	calculated @ 10% of subtotal				\$ 1.71
TOTAL COST PER LINEAR FOOT					\$ 25.72
TOTAL COST OF SAFETY IMPROVEMENTS FROM MILEPOST 1.05 TO MILEPOST 8.29					\$ 983,354.45

ITEM	COST	UNIT	QUANTITY PER LINEAR FEET		COST PER LINEAR FOOT OF ROADWAY
Pavement Marking Paint	\$2.45	Ft	5*1	5.0	\$ 12.25
				Subtotal	\$ 12.25
Mobilization and Temporary Traffic Control	calculated @ 15% of subtotal				\$ 1.84
Contingency	calculated @ 20% of subtotal				\$ 2.45
				Subtotal	\$ 16.54
Engineering, construction, management, drainage & utilities	calculated @ 40% of subtotal				\$ 6.62
Contingency for Price Increases	calculated @ 10% of subtotal				\$ 1.65
TOTAL COST PER LINEAR FOOT					\$ 24.81
TOTAL COST OF SAFETY IMPROVEMENTS FROM MILEPOST 8.29 TO MILEPOST 9.42					\$ 148,004.01